

APPARATUS AND METHOD FOR PAGE-RETRIEVAL USING ELECTRONIC-BOOK DISPLAY

BACKGROUND OF THE INVENTION

(1) Field of the Invention

The present invention relates to a document filing system, and more particularly, to an apparatus and method for page-retrieval using an electronic-book display employed in the system.

(2) Related Art

Today's document filing systems feature a page-retrieval function which use an electronic-book display, and the page-retrieval function has steadily been improved.

Japanese Laid-open Patent Application No. 2-181864 discloses one of these document filing systems. With this filing system, a location of a currently displayed page within a document is displayed relative to an entire book image, or so-called "an electronic-book display"; once an operator remembers a location of a frequently displayed page, he can retrieve that page easily at a later time. However, this filing system is not practical when many pages are frequently displayed, because the operator must remember all of the locations. Also, this filing system has another drawback in that a display frequency is not taken into account neither for the page-retrieval function nor a page-turning function.

Japanese Laid-open Patent Application No. 1-278170 and U.S. Pat. No. 5,146,600 disclose inventions which take into account the display frequency of the viewed objects. The number of times a key word is displayed or printed is determined. When a relation between the number of display times or the number of prints meets a predetermined condition, the two numbers are displayed on a screen. However, the numbers are referred to only to determine which documents are to be saved or not. Only the numbers are displayed, with no relative indication being given. Thus, the number of display times is not shown collectively for all the retrieved items, nor does the user have a convenient, graphical illustration of the relative frequency of displays. A page retrieval based upon the relative display frequencies for the pages has not yet been developed.

SUMMARY OF THE INVENTION

Accordingly, the present invention has an object to provide an apparatus and method of page-retrieval for indicating an important page to an operator by displaying the number of display times illustratively.

The present invention has another object to provide an apparatus and method of page-retrieval for retrieving an important page by referring to the number of display times stored in the apparatus.

The present invention has another object to provide an apparatus and method of page-retrieval for illustratively showing a relative location of each page within a document and their respective numbers of display times either in an electronic-book display or a non-electronic-book display.

The present invention has another object to provide an apparatus and method of page-retrieval using an electronic-book display for retrieving a frequently displayed page by attaching a mark at the fore-edge in the electronic-book display.

The above objects are fulfilled by a page-retrieval apparatus comprising: a unit for storing document image data; a unit for designating a document, image to be displayed; a first display unit for displaying the designated document

image on a screen by reading out corresponding document, image data from the document image data storing unit; a unit for counting the number of display times for each document image; a unit for generating number-of-display-times image data using the number of display times and a second display unit for displaying a number-of-display-times image on the screen based on the number-of-display-times, image data, the number-of-display-times image indicating the number of display times for each document image illustratively and being displayed with a document image when it is designated.

The apparatus may further comprise: a unit for storing a total page number of a document stored in the document image storage unit; a unit for determining a relative location of a currently displayed page within the document using the total page number and a page number of the currently displayed page; a unit for generating relative-location image data for the determined relative-location; and a third display unit for displaying a relative-location image on the screen at a same timing with a corresponding document image, the relative-location image indicating the determined relative location.

The document image storage unit may store the document image data in relation with their respective page numbers.

The first display unit may display the designated document image in a two-page spread electronic-book. The second display unit may display the number-of-display-times image on a corresponding page in the electronic-book. The third display unit may indicate a relative location of a currently displayed page by displaying a first to the currently displayed pages by a thickness in one of the right and left side, and displaying a following to a last pages by a thickness on the other side.

The apparatus may further comprise: a display-sequence-rule holding unit for holding a rule that determines a document image display sequence.

The designating unit may read out the rule from the display-sequence-rule holding unit to designate a document image under the rule.

The rule may be to display document images in an order of the number of display times.

The apparatus may further comprise: a unit for storing a page number of each document image together with coordinates of respective document images on the screen; a unit for storing the number of display times per document image together with their respective page numbers; a unit for specifying a point in a vicinity of the relative-location image of a page to be displayed; a unit for determining a page number corresponding to the specified point by reading out a coordinate from the coordinate storage unit; a unit for reading out the numbers of display times for a plurality of pages contained in a certain range from the determined page from the number-of-display-times storage unit.

The designating unit may designate document images under the display-sequence-rule using the read out numbers of display times.

The apparatus may further comprise: a unit for displaying a mark image along with a page, the mark image being displayed based on mark image data and emphasizing the page in an electronic-book; a unit for generating the mark image data; and a unit for controlling the mark image display unit.

The apparatus may further comprise a unit for measuring a display time for a document image.

The number-of-display-times counting unit may update the counting value only when the display time exceeds a predetermined period.